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State of Procedures in High Risk, Highly Regulated Processing Industries

Author:
Elliott P. Lander
Managing Director
Chief Innovation Officer

Scope

The general state of procedures in the highly regulated, high risk industries is poor. Most companies continue to use "Typewriter Technology," such as MS Word to create procedures and manage them through standard document management systems such as SharePoint, OpenText or Documentum.

Companies have focused on minimum compliance, at best, with little regard for incorporating human factors and technology innovations, including digitization, mobilization and personalization. Since the "typewriter technology" limits outputs to paper and requires substantial manual formatting, very little improvements are being made to enhance usage and effectiveness and are rapidly becoming both expensive and archaic to maintain.

SYNOPSIS

The state of procedures in the processing industry is poor relative to other benchmarked industries, such as nuclear and aerospace and the availability of digitized procedure technologies. There are a variety of reasons for this, but much of it stems from an industry satisfied with minimal compliance with process safety management regulations than an obsession for operational excellence and human reliability and the limitations of paper- based technology.

PROCEDURE VALUE

First of all, it is important to establish procedure value to the organization. Procedures are important for the following reasons:

- Ensure consistency of operations
- Provide support for inexperienced workers
- Ensure worker safety
- Ensure environmental protection
- Optimize tasks
- Ensure compliance with regulatory standards

For many companies, simply having "black text on a white background" with a good date and easily accessible, somehow, is good enough. Unfortunately, while the procedures may be considered "compliant," they are sub-standard from an operational excellence and risk management perspective.

STATE OF THE INDUSTRY

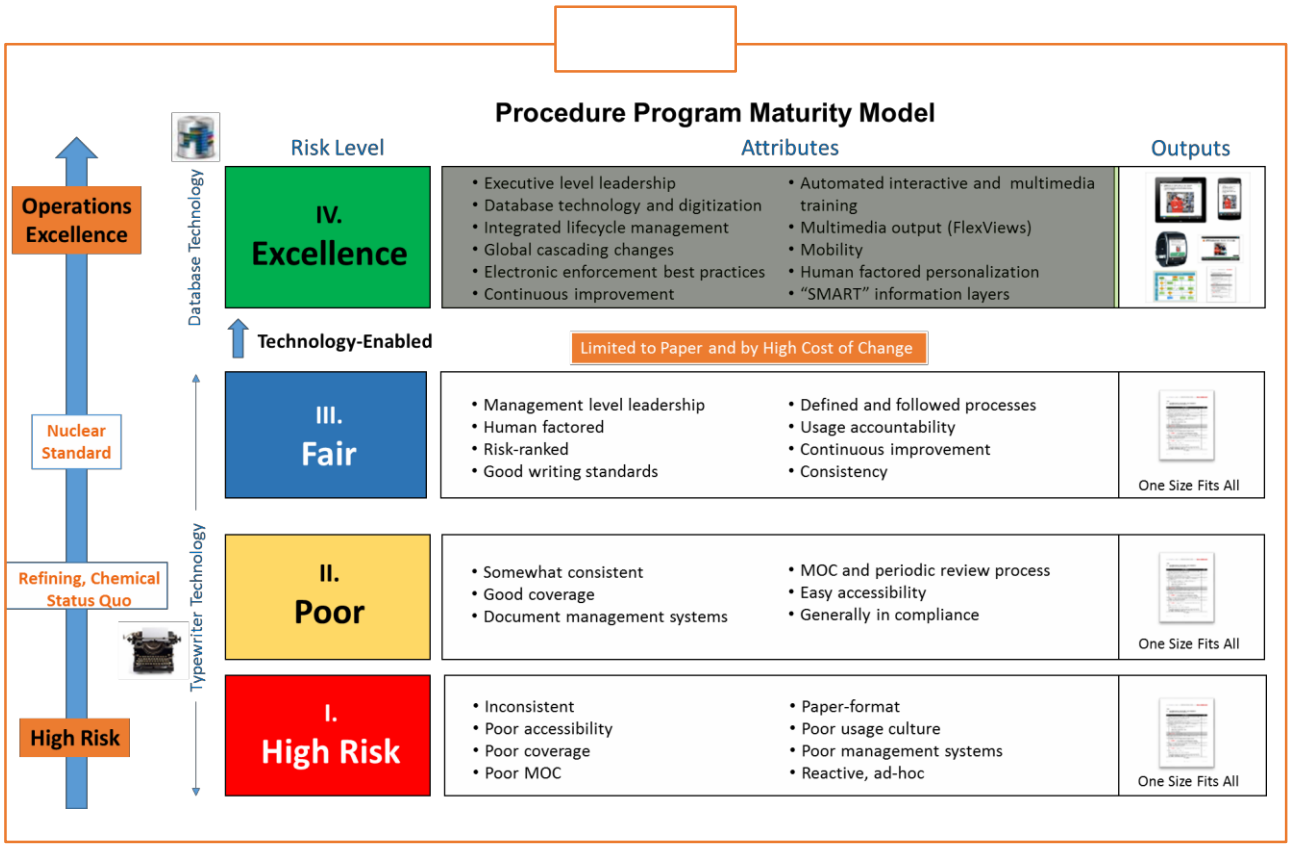
The vast majority of the industries procedure program have the following characteristics:

- Mostly done in MS Word
- Procedure output limited to paper
- Inconsistencies between procedures in presentation and structure
- "One-size fits all" procedure output
- Non-integrated lifecycle components
- Relatively good coverage of tasks
- No dedicated procedure program managers
- Fair document management controls
- Poor governance documentation
- Poor training for procedure writers
- Poor or non-existence procedure use and adherence policy
- Relatively slow change management and continuous improvement
- Little or no human factoring
- Little or no executive leadership

PROCEDURE PROGRAM MATURITY FRAMEWORK

Based on years of research, interviews and findings from the Advanced Next Generation Research Project at Texas A&M University, the authors have developed a Procedure Program Maturity Framework consisting of 4 levels, shown in Figure 1. The levels progressively measure the potential value and effectiveness of a company's procedure program based on a risk scale.

FIGURE 1



Lander-Rightmer Scale

PROGRAM STATUS

The nuclear power industry, historically considered the gold standard in procedure program excellence is level III (FAIR). Very good processes, good writing standards and good governance are key elements found throughout the industry. While having good standards, the industry almost exclusively creates procedures in MS Word and only outputs to a "hard-coded" paper based output.

The "typewriter technology" requires each document to be formatted manually and it is very difficult, expensive and resource intensive to make any substantial changes either in output or to alternative technologies. The reliance on MS Word restricts companies from creating an extensible and scalable human-factored procedure program.

PROCESSING INDUSTRY

While the nuclear industry is clearly at Level III, the processing industries (upstream, downstream, midstream, chemicals and conventional power) is situated at Level II (POOR). The standards, processes and governance are generally nowhere near the nuclear industry, resulting in higher risks, incidents and significant lapses in human reliability.

Unfortunately, while in the POOR classification, these companies may be considered compliant based on the relatively low standards and risk-based audit considerations. From this perspective, "if it ain't broke, don't fix it" is the excuse when compliance leads to complacency.

LEVEL IV – OPERATIONAL EXCELLENCE

Moving from Level III (FAIR) to IV (EXCELLENCE) requires a Next Generation technology upgrade with high standards of governance and accountabilities.

While "typewriter technology" produces blob of content, SmartProcedures use of Next Generation technology manages content at the discrete step level with layers of Smart information, enabling the content to be output to any device in any format. Next Generation procedures have the following characteristics:

- Manage content at discrete step level
- Maintain procedure content in normalized database
- Provide layers of "Smart" information at the step level
- Output procedure content in any format, on any device
- Ability to associate equipment and operating limits to equipment objects
- Personalize the output based on function and user requirements
- Digitize readings and step sign-off for actionable data reporting
- Mobilize the procedures and output to any device
- Enable global changes across entire library of procedures automatically

PROCEDURES AND HUMAN FACTORS

Another important element of Level IV (EXCELLENCE) procedures is the ability to incorporate critical human factors into the procedure presentation. Digital smart procedure technologies (such as SmartProcedures) technology provides the foundation for displaying the content to meet the needs of the user (any format, any device) versus the "one-size-fits-all" limitation of Word.

Human factor considerations to improve quality and usability of procedures includes:

- Increasing font size to make it easier to read
- Using text-to-speech audio for English as 2nd language
- Multi-lingual content capabilities to support 2 or more languages
- Providing options to display or not display graphics based on user experience
- Provide video reinforcement
- Mobilize procedure content
- Enable digital sign-off versus pen and ink
- Enable real-time collaborative procedures

- Enable user to change backgrounds in different lighting situations
- Enable context sensitive linking for IoT/Industry 4.0 interactivities
- Enable user to be remote with immediate access to 100s of procedures via tablet or SmartPhone
- Different layouts for emergency versus standard operating procedures

SUMMARY

To improve bottom line profitability and worker safety, many companies are in serious need to upgrade and modernize their neglected procedure programs. Digital and interactive procedure technology provides an important step to digitize, mobilize and personalize procedure content for greater levels of usability and procedure effectiveness.

Comparison of Word and Smart Procedure Technology

Feature	MS Word	Digital/ Smart Procedures
Digitize content	✗	✓
Mobilize content	✗	✓
Interact/sign-off procedures	✗	✓
Multi-functional outputs	✗	✓
Global change capability	✗	✓
Output to interactive procedure training	✗	✓
Electronic enforcement	✗	✓
Electronic analysis of procedure content	✗	✓
Integrated procedure lifecycle management	✗	✓
Human factoring/personalization of content	✗	✓
Digital sign-off with actionable step-based data	✗	✓